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19. ABSTRACT (Continue on reverse if necessary and identify by block number) Progress was made in the following two areas: 1. <u>Photodissociation Dynamics of Small Cluster Ions</u> (work was completed on one system and preliminary work done on several others) 2. <u>Generation, Structure and Reactivity of Metallic and Semiconductor Clusters</u> (two papers published and a large amount of preliminary work accomplished)			
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Photodissociation Dynamics of Cluster Ions Final Report

Principal Investigator - Professor Michael T. Bowers

I. Abstract

We had originally planned to work on three separate topics during the one year tenure of this grant: 1) Photodissociation Dynamics of Small Clusters of Atmospheric Interest; 2) Generation, Structure and Reactivity of Carbon Clusters, and 3) Generation and Reactivity of Metallic Clusters. Progress was made on area 1), substantial progress was made on area 2), and it was decided to delay area 3) to a date in the near future. In all three areas papers were published and preliminary work done that will lead to five or six more.

II. Objectives

- A. Photodissociation Dynamics of Atmospheric Cluster Ions
- B. Generation, Structure and Reactivity of Semiconductor and Metallic Cluster Ions

III. Progress

A. Photodissociation of Cluster Ions

Details of the work have been given in the proposals written and supported for Grants AFOSR 92-J-0021 and F49620-93-1-0134 and will not be repeated here. We completed the work and published a paper on the $\text{N}_2\text{O}\cdot\text{H}_2\text{O}^+$ system. Preliminary studies have also been completed on $\text{OCS}\cdot\text{CH}_3\text{I}^+$ and this work will be published in the future.

B. Carbon Clusters

Again, the details of the work are given in the proposal funded as F49620-93-1-0134 and will not be repeated here. Two papers were published on initial aspects of this work and a great deal of preliminary work completed that will lead to five or six papers in the next year.

C. Metallic Clusters

Work in this area was delayed due to the great progress being made on carbon clusters.

IV. Papers Published or In Press

Structure and Stabilities of Carbon Cluster Ions, G. von Helden, M-T. Hsu, P.R. Kemper and M.T. Bowers, *SPIE Proceedings, "Applied Spectroscopy in Materials Science II"*, W.G. Golden (ed) 1636, 182 (1992)

The Dynamics of Photodissociation of the Gas Phase $(N_2O \cdot H_2O)^+$ Cluster Ion, S.T. Graul, H-S. Kim and M.T. Bowers, *Int. J. Mass Spectrom. Ion Proc.* 117, 507 (1992).

One- and Two-Dimensional Carbon Clusters: Isomers, Structures and Isomer Abundances, G. von Helden, M-T. Hsu, P.R. Kemper and M.T. Bowers, *Materials Research Society, "Symposium Proceedings, Novel Forms of Carbon"* 270, 117 (1992).

V. Personnel Associated with the Project

A. Senior

Dr. Paul Kemper

Dr. Susan Graul

Dr. Nigel Gotts

B. Junior

Ms. Hyun-Sook Kim

Mr. Gert von Helden

Mr. Ming-Teh Hsu

VI. Papers presented at Meetings/Universities

A. Invited Lectures

Invited Lecture, Symposium on Mass Spectrometry, SPIE O'LASE 92, Los Angeles, CA, January 1992

Invited Lecture, Symposium on Fullerenes, Materials Research Society Meeting, San Francisco, CA, May 1992

Invited Lecture, Symposium on Fullerenes, National Electrochemical Society Meeting, St. Louis, MO, May 1992

Invited Lecture, Symposium on Fullerenes, American Society for Mass Spectrometry, Washington, DC, June 1992

Invited Lecture, Symposium on the Dynamics of Clusters, American Chemical Society, Washington, DC, August 1992

Invited Lecture, Air Force Contractors Meeting, Washington, DC, October 1992

B. Contributed Papers

Presented 3 papers, Western Regional Conference on Gas Phase Ion Chemistry, Lake Arrowhead, CA, February 1992

Presented 2 papers, American Society for Mass Spectrometry, Washington, DC, June 1992

C. Seminars at Universities

Ohio State University, May 1992

Virginia Commonwealth University, May 1992

University of Wisconsin, November 1992

University of California at Irvine, November 1992

Accession for

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